

# FIELD SAMPLING PLAN FOR HISTORICAL RAILROADS

St. Francois County Mined Areas

Site:	Big River Mill Aug
ID #	MO2981126899
Event:	KO
Other:	10-4-26
gm	

Prepared by:



730 17<sup>th</sup> Street, Suite 925  
Denver Colorado 80202





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OCT 05 2006

SUPERFUND DIVISION

October 4, 2006

Mr. Bruce Morrison  
Superfund Division  
U.S. EPA Region VII  
901 North 5<sup>th</sup> Street  
Kansas City, KS 66101

**Re: Additional Work for the St. Francois County Mined Areas RI/FS  
Field Sampling Plan for Historical Railroads  
AOC Docket No. 97-F-0002**

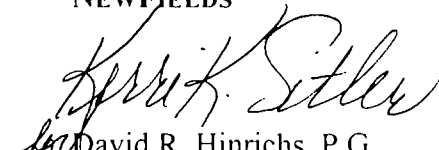
Dear Mr. Morrison:

On behalf of The Doe Run Company, attached please find two copies of the *Field Sampling Plan for Historical Railroads*. This work is proposed as part of the Additional Work to be conducted pursuant to the reference AOC as discussed in the July 2006 meeting with EPA. The Doe Run Company plans to implement this work this fall, if approved. We have tentatively approached the landowners where we would need to gain access for the field activities and believe they will grant us access for this work. We are prepared to formally request access when we have heard from you that there are no significant comments that would need to be addressed.

Please call Kerri Sitler or myself, if you have questions or comments. We look forward to your approval to implement this plan.

Sincerely,

NEWFIELDS

  
David R. Hinrichs, P.G.  
Project Manager

Attachment

NEWFIELDS  
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# **FIELD SAMPLING PLAN FOR HISTORICAL RAILROADS**

St. Francois County Mined Areas

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OCT 05 2006  
SUPERFUND DIVISION

**October 4, 2006**

*Prepared by:*



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## Table of Contents

	<u>page</u>
1.0 SITE LOCATION AND DESCRIPTION.....	1
2.0 OBJECTIVES .....	2
3.0 FIELD ACTIVITIES.....	2
3.1 Extent of Historical Railroads .....	3
3.2 Estimates of Cross-Sectional Area of Railroad Ballast .....	3
3.3 Ballast Sampling .....	4
3.3.1 Sampling Method .....	4
3.3.2 Description of Decontamination Procedures for Sampling Equipment .....	5
3.3.3 Investigation-Derived Wastes .....	5
4.0 SCHEDULE AND REPORTING .....	5
5.0 REFERENCES .....	5

## List of Figures

(Figures are located after the text)

- 1 Historical Railroads in the St. Francois County Mined Area
- 2 Proposed Locations of Cross-sections and Ballast Samples
- 3 Field Sampling Form

# **Field Sampling Plan for Historical Railroads St. Francois County Mined Areas**

This Field Sampling Plan for Historical Railroads (RRFSP) is submitted as an Addendum to the Field Sampling Plan for Focused Remedial Investigation/Feasibility Study (FSP), St. Francois County, Missouri site (the Site) dated November 19, 1997 (Dames & Moore, 1997). This RRFSP outlines inspection, sampling, and analytical methods and quality control procedures that will be used in conducting an assessment of the nature and extent of mine-related materials associated with historical railroad beds in St. Francois County located in southeastern Missouri. This RRFSP has been prepared by NewFields on behalf of The Doe Run Company and is being conducted as Additional Work pursuant to Administrative Order on Consent (AOC), U.S. Environmental Protection Agency Docket No. VII-97-F-0002, dated January 29, 1997.

Data Quality Objectives (DQOs) are described in the Quality Assurance Project Plan, Appendix A of the FSP (Dames & Moore 1997).

## **1.0 SITE LOCATION AND DESCRIPTION**

The Site is located in southeastern Missouri entirely within St. Francois County, approximately 70 miles south of St. Louis. The topography is hilly with several hundred feet of relief with altitudes ranging from about 700 to 1,000 feet above mean sea level (msl). The climate in St. Francois County is continental with cold winters and hot summers. Annual precipitation is approximately 40 inches with a rainy season in fall and winter. Average annual snowfall is 13.7 inches. Prevailing winds are from the south (Fluor Daniel 1995).

Within the Site boundaries (Figure 1) are the incorporated towns of Desloge, Bonne Terre, Park Hills, Leadwood, and Leadington and the unincorporated towns of Frankclay, Wortham, Gumbo, Doe Run and East Bonne Terre. The population of the Site is roughly estimated at 15,000-20,000 (Fluor Daniel 1995).

St. Francois County is located in a historic mining area called the Old Lead Belt. The Old Lead Belt is on the northeastern edge of the Precambrian igneous core of the St. Francois Mountains. This area is one of the world's largest lead mining districts, having produced more than nine million tons of pig lead (MDOH 1997). The first recorded mining in St. Francois County occurred at Mine-a-Gabore between 1742 and 1762. The important discoveries of disseminated lead in the Bonne Terre, Leadwood, and Flat River areas occurred in 1864. The introduction of the diamond drill in 1869 facilitated the discovery of additional reserves and output from the mines increased dramatically in the late 1800s. Mine output from St. Francois County peaked in 1942 when the concentrate equivalent of

197,430 tons of lead was produced. Mining ceased in the Old Lead Belt in 1972 with the closing of St. Joe Lead Company's Federal mine (Fluor Daniel 1995).

Within the Site boundaries (Figure 1) there are eight designated mining areas:

- Desloge (aka Big River Mine Tailings)
- Federal (aka St. Joe State Park)
- Leadwood
- Bonne Terre
- National Lead Site
- Elvins/Rivermines
- Hayden Creek
- Doe Run.

It has been estimated that some 250 million tons of tailings and chat were produced in the Old Lead Belt from ore milling and beneficiation processes. The chat has been used extensively as aggregate for ballast in railroads, aggregate in concrete and asphalt, and fill.

## 2.0 OBJECTIVES

Rail lines from former mining areas to main rail lines and between mining areas are no longer in use and have been abandoned. Figure 1 shows rail lines that have been abandoned, as well as the active rail lines. The objective of this RRFSP is to characterize and estimate the volume of chat and other mining and non-mining materials used in abandoned railroad beds. Samples will be collected to assess the lead, cadmium, and zinc content of these materials.

## 3.0 FIELD ACTIVITIES

The following activities will be conducted.

- Historical railroads shown on Figure 1 will be verified and remapped, if necessary.
- Seven to ten cross-sections will be made to estimate cross-sectional area of the railroad ballast.
- Composite samples will be collected at each cross-section to assess metal content of the railroad ballast.

### **3.1 Extent of Historical Railroads**

The known extent of historical railroads, as presented on Figure 1, has been developed using The Doe Run Company's historical mining maps. Most of the larger mines and concentrators were accessed by rail – historical or active – to provide a means of transporting material to and from the site. Some, however, do not. While it is quite likely that material could have been trucked away from these sites, the presence of historical rail lines will be examined if access to the property can be obtained. For example, the figure does not show any railroads accessing the Doe Run mining area near the town of Doe Run. This area will be examined as one historical rail line appears to head in the direction of Doe Run but stops at no known mining site (probably the edge of the historic map) – area marked as "Possible RR" on Figure 1.

Aerial photographs will be examined to identify potentially unmapped rail lines. The presence of other rail lines will be ground-truthed if the photograph examination indicates the presence of unmapped lines. Figure 1 will be modified, if necessary, to add any additional historical rail lines found.

### **3.2 Estimates of Cross-Sectional Area of Railroad Ballast**

The seven to nine cross-sectional areas will be used to assess the average thickness of the ballast in the historical railroads. Nine generalized locations along the historical railroads have been identified to assess the cross-sectional area of the remaining railroad ballast (Figure 2). These locations have been selected based on their rural locality in the attempt to be able to isolate the ballast so that a volume can be estimated.

As all these locations are on private land, access to the property will need to be obtained prior to volume estimation. At least seven locations will be measured. If access cannot be obtained from at least seven of the marked locations, additional locations will be added until access to seven locations is obtained.

At each location, the cross-sectional area of the ballast will be estimated. The location of the cross-section will be marked on a map and a Global Positioning System (GPS) reading will be made at the center of the cross-section. A cross-sectional drawing at each location will be made and will include thickness, layering, and lithology variation, if present. Figure 3 presents the field form that will be used to depict the cross-section. The thickness of the ballast will be assessed using a shovel or hand auger. At the field personnel's discretion, the ballast will either be trenched or a series of exploration borings will be made into the ballast. Character of the material will be described, including, but not limited to, grain-size, color, consistency, and organic content. Vegetation on and beside the ballast will be described in terms of nature, diversity, and distribution. Photographs and other notes will be made.

### 3.3 Ballast Sampling

#### 3.3.1 Sampling Method

At each ballast cross-section location a composite sample will be collected to characterize the metal content of the ballast. The composite will be composed of at least five aliquots. The aliquots will be collected to represent the entire ballast material, even if two (or more) distinct materials are identified in the ballast.

Each sampling location will have a field sheet diagramming the railroad bed and the aliquot sampling locations (Figure 3). The diagram shall show the general configuration of the railroad and any other hard feature nearby used for locating the sampling area (roads, fences, etc.). If an organic layer is present above the soil, the duff, litter, grass, and roots will be removed. Soil shall be composited from all aliquot locations into a stainless steel bowl. All samples collected and shipped to a laboratory for analytical analysis will be recorded on a chain-of-custody. All samples will be analyzed by EPA Method SW-846 6010B for cadmium, lead, and zinc. Sample volume not used to fill the laboratory jar will be returned to the sample location.

Sample blind duplicates will be collected at a 5 percent frequency. A minimum of one field duplicate will be collected. Requirements for sample storage and preservation are included in the Site's QAPP (Dames & Moore 1997).

At a minimum, the following information will be recorded in a field logbook or on the field sampling form (Figure 3):

- Location and description of sampling point
- Identification of sampling team members
- Volume of sample collected
- Sampling methodology
- Sample preservation
- Date and time of sample collection
- Sample identification
- Field observations
- Results of field measurements, if collected
- Decontamination procedures
- Field instrument calibration results, if required.

Because sampling situations vary widely, no general rules can specify the extent of information that must be documented. However, documentation will contain sufficient information to reconstruct the sampling activity without relying on the sampler's memory. The field documentation will be kept under strict chain-of-custody.



### **3.3.2 Description of Decontamination Procedures for Sampling Equipment**

Equipment (spoons, bowls, shovels, trowels) used to collect soil samples shall be decontaminated between composite samples by washing in a soap solution (such as Alconox), rinsing with potable water, and allowing to air dry.

### **3.3.3 Investigation-Derived Wastes**

The generation of investigation-derived wastes will be held to a minimum. Used personal protective equipment and field disposables will be bagged and disposed of at the dumpster located near The Doe Run Company's Desloge field office.

## **4.0 SCHEDULE AND REPORTING**

The historic railroad field program will commence upon EPA's approval of this FSPRR by obtaining access to the sampling locations. Field sampling is planned to be conducted in the Fall 2006 and is expected to be conducted within a week. EPA will be given a seven-day notice of when fieldwork will begin. A report including all field observations and analytical data will be submitted to EPA 60 days after the field crew leaves the field. This report will be submitted as an addendum to the St. Francois County Mined Areas Remedial Investigation Report (NewFields 2006). Electronic data will be transmitted to EPA with the report.

## **5.0 REFERENCES**

- Dames & Moore, 1997. Field Sampling Plan for Focused Remedial Investigation/Feasibility Study, St. Francois County, Missouri. November 19.
- Fluor Daniel, 1995. Initial Remedial Investigations for the Big River Mine Tailings Site, St. Francois County, Missouri.
- MDOH, 1997. Big River Mine Tailings Superfund Site, Lead Exposure Study: Report to the Agency for Toxic Substances and Disease Registry. Draft Final Report, April 21.
- NewFields, 2006. Focused Remedial Investigation for Mined Areas in St. Francois County, Missouri. March 3.

## Figures



**Legend**

----- Active Railroads

**Historic railroads**

++++ Mapped

----- Possible RR

[Pattern] Chat

[Pattern] Tailings

[Pattern] St. Francois Co Mined Area

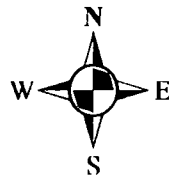
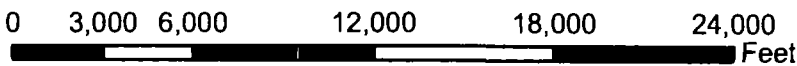







Figure 1  
Historical Railroads in the  
St Francois County Mined Area



**Legend**

-  HistRR Cross-section & Sampling Location
-  Active Railroads
- Historic railroads**
-  Mapped
-  Possible RR
-  St. Francois Co Mined Area

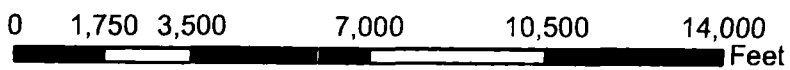


Figure 2  
Proposed Locations of  
Cross-sections and Ballast Samples

## Historical Railroads Ballast Characterization

Sampling Location: \_\_\_\_\_ Date: \_\_\_\_\_

GPS \_\_\_\_\_ and \_\_\_\_\_

Site Sketch (provide horizontal measurement if drawing is not to scale)

	<p><u>Legend:</u></p>          <p>Mark horizontal locations of all sample aliquots</p>
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Vegetation Description:

*Cross-Section (provide both horizontal and vertical measurements)*

Legend:

Mark locations of all sample aliquots

Sampling Method: \_\_\_\_\_ Sample ID(s) \_\_\_\_\_

Analysis Requested    6010B for Cd, Pb and Zn    Volume:    Laboratory:    EAL

Comments: